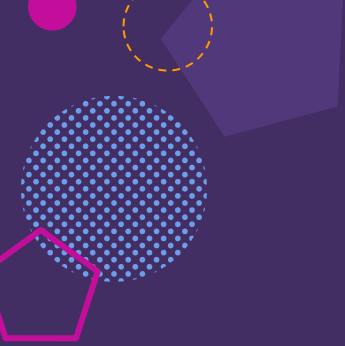


Computational
Thinking in School
Mathematics: It's
Elementary!



Hello!

George Reese, MSTE at University of Illinois

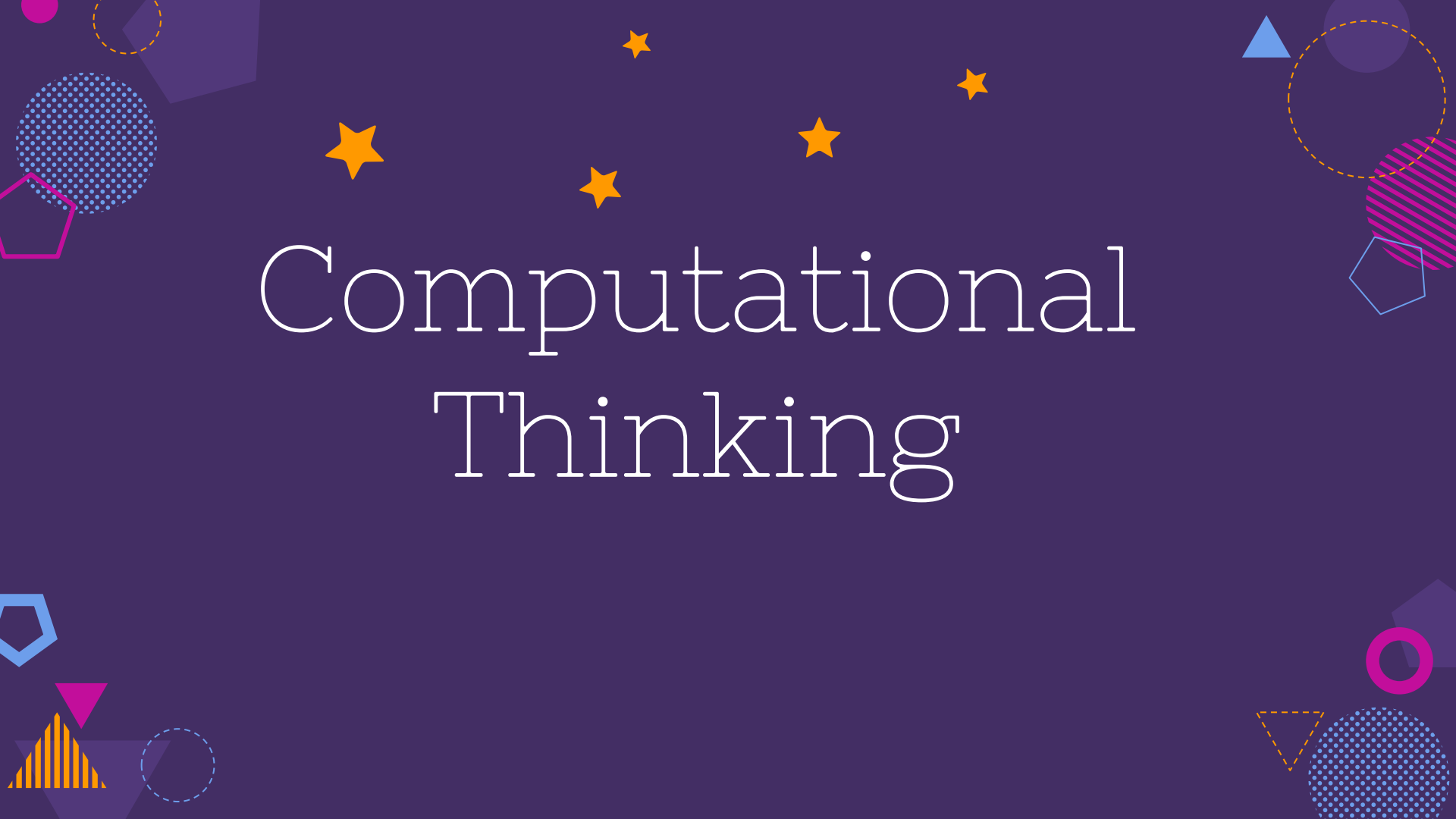
Wendy Maa, Kenwood Elementary School

Carla Strickland, UChicago STEM Ed

All collaborators on LTEC, an NSF funded project
(Learning Trajectories for Everyday Computing)

everydaycomputing.org



The background is a solid dark purple. It is decorated with various geometric shapes in different colors and patterns. In the top left, there is a pink circle, a dashed yellow circle, a solid purple pentagon, and a blue circle with white dots. In the top right, there is a blue triangle, a dashed yellow circle, a solid purple circle, a pink circle with white dots, and a blue pentagon. In the bottom left, there is a blue pentagon, a pink triangle, a yellow triangle with orange stripes, and a dashed yellow circle. In the bottom right, there is a pink circle, a blue triangle, a dashed yellow circle, and a blue circle with white dots. Scattered across the top half of the image are several orange stars of different sizes.

Computational Thinking

Problem-solving processes include:



Decomposition

Breaking down processes or problems into smaller parts

Pattern Recognition

Observing patterns and trends

Abstraction

Identifying general principles that generate patterns

Algorithmic Design

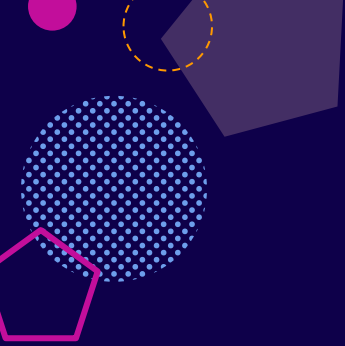
Developing step by step instructions for solving similar problems

Adapted from Google CT for Educators

Objectives



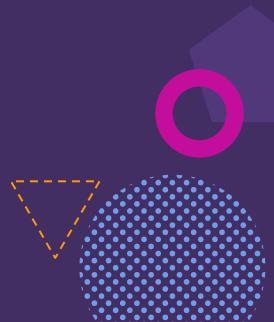
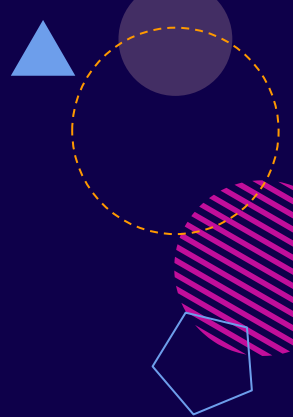
- We will show 3 examples of integrated Math+CT activities.
- How are they different?
 - Teacher instructions
 - Classroom experiences
 - Student work



1.

Polygons

2nd Graders



Walking a Polygon vs. Drawing a Polygon



Walking a Polygon



Walking a Polygon



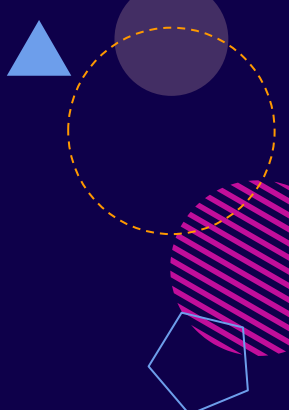
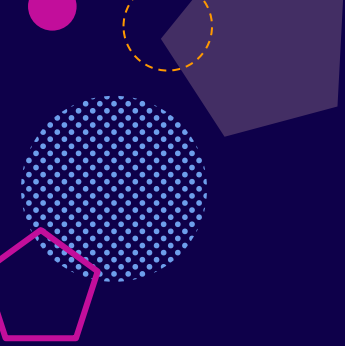


Then put it in the computer.



And, of course, kick it up a notch!

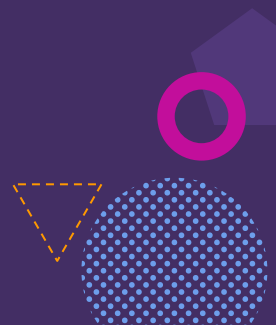




2.

Fractions

3rd Graders



Number Line Mysteries

Example Math Task 1



- I am a point on a number line that starts at 10 and ends in 60
- The number line between 10 and 60 is cut into 5 equal pieces
- I am smaller than 40
- I am larger than 30
- I am a multiple of 5
- Who am I?

Fraction Number Line Mysteries

Example Math Task 2



- I am a point on a number line between 0 and 1
- The number line is cut into 8 equal pieces
- I am smaller than $\frac{1}{2}$
- I am larger than $\frac{1}{8}$
- My denominator is an 8
- My numerator is an odd number
- Who am I?

Anchor Chart for features of a Fraction Number Line Mystery



Decomposing Fraction Number Line Mysteries

- Clue #1 gives the starting and ending points on the number line
- The last clue always asks “Who am I?”
- Clue #2 tells how many pieces the number line is cut into
- Middle clues help to eliminate possible answers
- There should only be one possible answer

Fraction Number Line Mysteries

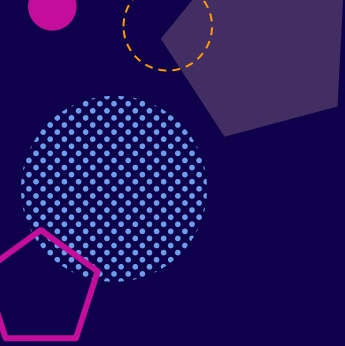


- Math Task: “Students practice and create a Number Line Mystery.”
- Math+CT Task: “Students create a digital representation of a Number Line Mystery using Scratch. Students improve their understanding of **logic and sequencing**.” (Also allows for creativity and more engagement.)

Duplicating Mysteries in Scratch



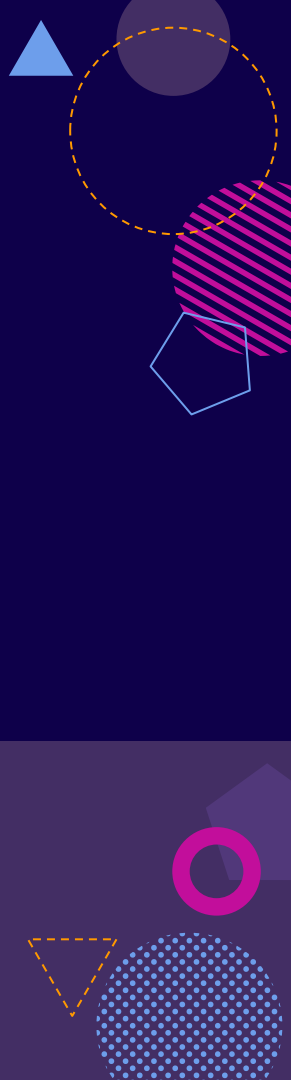
- ① [Teacher Example](#)
- ① [Zander](#)
- ① [Denise](#)
- ① [Jaiden \(not finished\)](#)



3.

Fractions

4th Graders



Fraction Number Stories



- Math Task: “Students solve a fractional parts number story.”
- Math+CT Task:
“Students write a fractional parts number story using partitioning and animate their number story so that another student could interact with the program to answer the problem. They will use conditionals to code the program’s response to the inputted answers.”

Fraction Number Stories in Scratch



Student Work Samples:

- [Alien Penguins](#)
- [Helpful Elephant](#)



Thanks!

Any questions?

everydaycomputing.org

Credits



Special thanks to all the people who made and released these awesome resources for free:

- Presentation template by [SlidesCarnival](#)
- Photographs by [Unsplash](#)